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February 9, 1952

SCIENCE NEWS LETTER

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THE WEEKLY SUMMARY OF CURRENT SCIENCE

Tagged Plant Food

See Page 87

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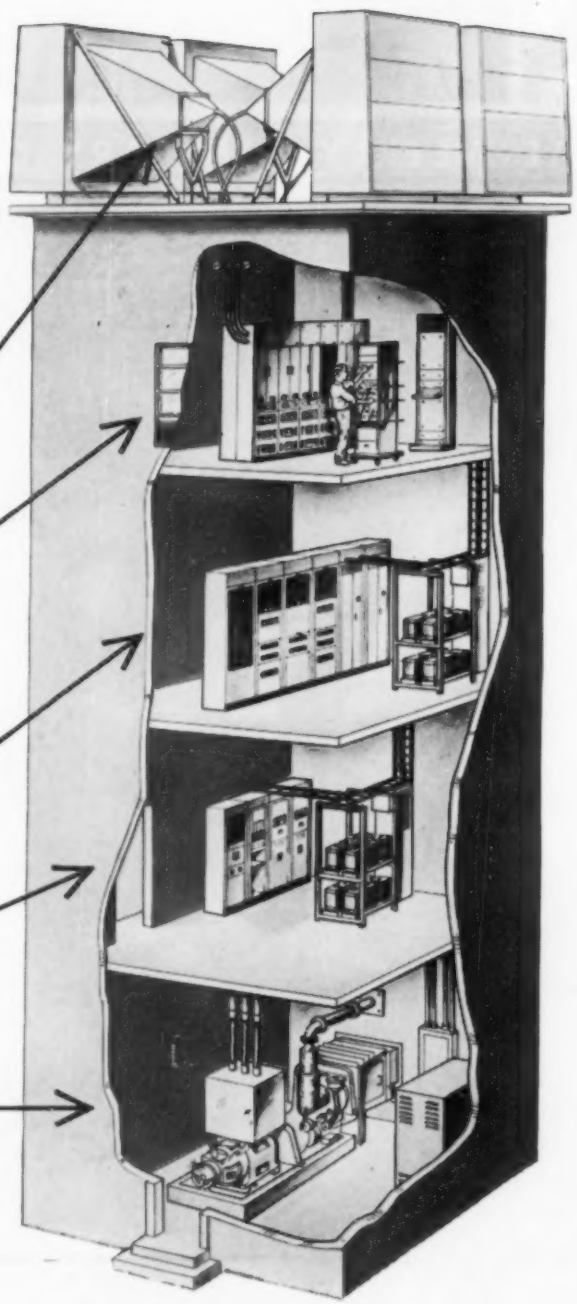
VOL. 61 NO. 6 PAGES 81-96

What's inside a *Radio-Relay* station?

Because microwaves travel in straight lines and the earth is round, there are 123 stations on the transcontinental television route between Boston and Los Angeles. This view of a typical unattended station shows the arrangement of the apparatus which amplifies the signal and sends it on.



ON THE ROOF are the lens antennas, each with its horn tapering into a waveguide which leads down to equipment

ON THE TOP FLOOR, where the signal is amplified, changed to a different carrier-channel and sent back to another antenna on the roof. Here are testing and switching facilities. Normally unattended, the station is visited periodically for maintenance.

ON THE THIRD FLOOR are the plate voltage power supplies for several score electron tubes.

ON THE SECOND FLOOR are filament power supplies. Storage batteries on both floors will operate the station in an emergency for several hours, but

ON THE GROUND FLOOR is an engine-driven generator which starts on anything more than a brief power failure.

Anything that happens—even an opened door—is reported to the nearest attended station instantly.

Coast-to-coast *Radio-Relay* shows again how scientists at Bell Telephone Laboratories help your telephone service to grow steadily in value to you and to the nation.

BELL TELEPHONE LABORATORIES

Improving telephone service for America provides careers for creative men in scientific and technical fields.

METEOROLOGY

Seeding May Reduce Rain

Spraying immature thunder clouds with silver iodide may decrease natural rainfall. Predicting thunderstorms from energy in atmosphere proposed.

➤ TRYING TO make it rain out of immature thunder clouds by seeding them with silver iodide may actually decrease the amount of rain which would have fallen naturally over an area. This is the opinion of Dr. E. J. Workman, president of the New Mexico Institute of Mining and Technology, presented at a session of the American Meteorological Society meeting in New York devoted to artificial rainmaking.

In fact, said Dr. Workman, if silver iodide crystals are efficient substitutes for natural water-droplet-forming nuclei in the air, it would appear reasonable to undertake a rain reduction program in some areas by extensive pollution of the atmosphere with these crystals.

Seeding immature clouds may dissipate some of the energy necessary within the general area for the creation of thunderstorms and thus actually reduce the amount of rain which otherwise would have fallen naturally.

This might have an effect on the weather over a very large area. Dr. Workman pointed to the theory held by Nobel Prize Winner Dr. Irving Langmuir that "rainmaking" with silver iodide in New Mexico had an effect on the weather over a large area of the United States.

Dr. Workman said that the local effect which he found of dissipating energy by seeding with silver iodide crystals might be responsible for the widespread effect rather than any local increase in rain over New Mexico.

Originally an enthusiast over the possibilities of increasing rainfall by cloud seeding, Dr. Workman admitted that "the enthusiasm with which we started about four years ago has not been sustained. Our simple field experiments designed to test elements of current rain-increasing practice have been inconclusive for the most part, and, moreover, our accumulated laboratory observations give us cause to doubt some of the basic assumptions inherent in the youthful rainmaking technology."

Dr. Langmuir, speaking at the same session, reported on a statistical study which, he said, showed that periodic seeding with silver iodide in New Mexico caused periodic effects in rainfall over a wide area of the United States.

He asserted that the agreement which he found between most of the rainfall and seeding phases "gives conclusive proof that the periodicity was actually caused by silver iodide seeding."

Dr. Langmuir disagreed with statistician Glenn Brier of the U. S. Weather Bureau. Mr. Brier stated that based on usual scientific standards "it appears that the hypothesis that silver iodide seeding affected the larger scale features of the weather or circulation has not been demonstrated."

Discussion of whether or not seeding with silver iodide crystals on a periodic basis actually causes large-scale changes in the weather has been going on for more than two years. Many meteorologists and physicists believe that the controversy will never be settled.

Forecasts for Jets

➤ WEATHER REPORTS will have to come from twice as high up and twice as fast when jet airliners go into commercial operation all over the world. Jet airliners will fly twice as high and twice as fast as the "old-fashioned" four-engined propeller planes now in use.

The need for more accurate reports of cloud and wind conditions up to 40,000 feet and for faster weather reporting to jet pilots was illustrated in test flights of the British jet airliner the Comet I. It will go into service on the London-Rome-Cairo run this spring.

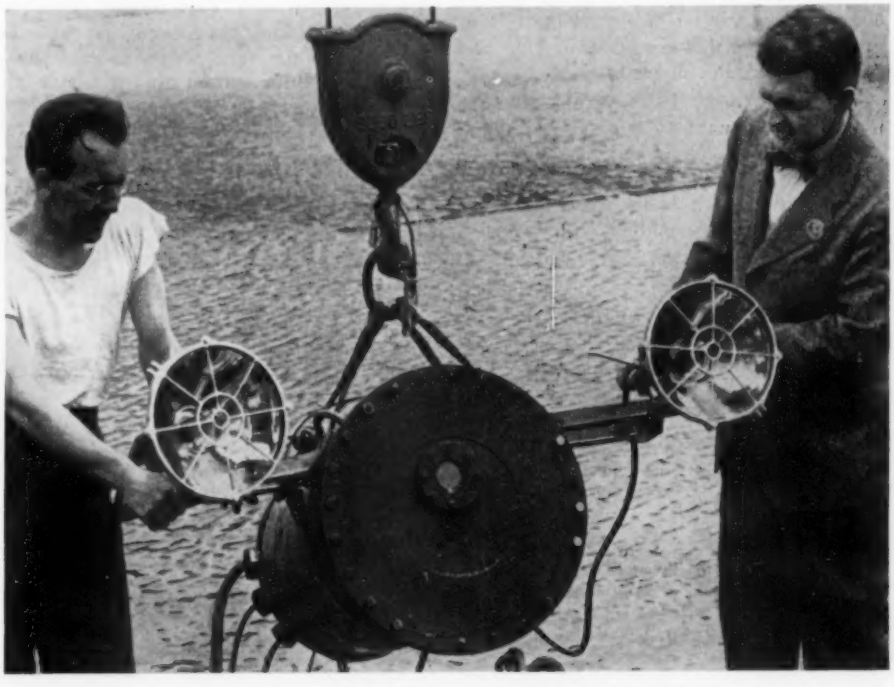
The meteorological problems involved were described by A. C. Campbell Orde, operations development director of the British Overseas Airways Corporation, operators of the Comet. He spoke at a joint meeting of the American Meteorological Society and the Institute of the Aeronautical Sciences.

Mr. Orde described a flight of the Comet from London to Singapore and return. The pilot was constantly receiving inadequate or inaccurate weather briefings as to what kind of cloud conditions and wind speeds and directions he would find at 40,000 feet along his route. The average cruising level of the Comet is 40,000 feet.

In addition the pilot needed, while in flight, quick and accurate information as to temperatures, visibility and wind speed and direction at the airport at which he planned to land. The same information was required for alternate landing fields. Several times on the flight some of this information was late in coming in.

Temperature of the field at take-off is extremely important to the Comet, Mr. Orde said. A difference of one degree Centigrade is equivalent to between 200 and 250 pounds in payload.

These problems did not prove to be unsolvable, the B. O. A. C. executive said. No fundamental changes are necessary—



UNDERWATER TV CAMERA—Engineers adjust the flood lights on one of the U. S. Navy's underwater television cameras before lowering it to the ocean's floor where it will serve as a "seeing eye" for divers. It is manipulated by remote control and records a picture that is transmitted to a television-like screen on the ship.

merely more speed and greater altitudes for meteorology.

He called for more intensive upper air research on a worldwide scale and a more global type of weather service, not compartmentalized along national lines.

Sun Affects Weather

➤ THE EFFECT of the changing sun's energy on the surface of the earth and its oceans may have a bearing on whether abnormal weather persists or suffers sharp changes from month to month.

This was the hypothesis put forth by Jerome Namias, chief of the U. S. Weather Bureau's extended forecast section, at the American Meteorological Society meeting. His assumption was made after a study of how and when weather conditions varying from normal persisted or failed to persist from month to month.

Mr. Namias was not considering normal seasonal changes or persistences in the weather. He was considering why, if December was colder than usual, for instance, it was more likely than not that January also would be colder than usual. Measurements showed that this persistence in a specific abnormal weather pattern existed for all months of the year except for April and May in the spring and October and November in the fall.

Great and often abrupt transitions of long-period weather regimes have happened between these two pairs of months, he discovered. The greatest likelihood that one month would be similar to the following month, weatherwise, was in July and August, his studies showed.

The weather we have during any one month is the result of a pattern of wind currents high up circling the northern hemisphere from west to east. Their speed, whether their path is more to the north or south and whether their path bends in deep or shallow waves, must be the result of powerful forces.

One of these forces, he hypothesized, may be the amount of solar energy which is allowed by cloud cover to hit the surface of both the oceans and the earth. In addition, how that energy is absorbed or reflected can help change the weather pattern, or help keep it along the same track.

The weather pattern, he said, may be in harmony with this solar energy, and thus the energy helps it to persist. Or it may be at variance with it, and thus we see the great changes which take place between April and May and between October and November. The evidence, he said, pointed to a general tendency toward persistence of weather patterns, except at those times, rather than toward abrupt changes.

Mr. Namias said that there was no conclusive evidence for the hypothesis put forward by some other meteorologists that sunspot activity had a bearing on this persistence.

Predicting Thunderstorms

➤ FIGURING OUT whether there is enough energy in the atmosphere to make a thunderstorm may be a good way to predict thunderstorms. This is the opinion of Roscoe R. Braham, Jr., of the University of Chicago, presented at the meeting of the American Meteorological Society.

The total energy for a thunderstorm, he said, can be figured if the latent heats of condensation in the rainfall, of the water which is evaporated in the downdraft and the water which remains as cloud after the thunderstorm is over, are all added together. This amount of energy must be available in the atmosphere before a storm is started. Furthermore this available energy must exist in addition to the energy nature uses in the uniform heating of the environment.

Mr. Braham figured out how much energy was necessary for the formation of the average thunderstorm. It follows, he said, that whenever that amount of energy is present in the atmosphere, a thunderstorm will develop. Thus they can be predicted.

Mr. Braham tested his theory through the use of radar echoes of water drops in the sky over a wide area before they began to fall. This, he said, was a good measurement of convection—the movement upward of a column of air. What he saw on the radar screen, correlated rather well with his measurements of energy, he said, although not enough data are yet available to be positive about it.

Science News Letter, February 9, 1952

Question Box

ASTRONOMY

How many moons are now known to circle the sun's family of planets? p. 90.

BIOPHYSICS

In what way is photosynthesis being attempted outside the living cell? p. 87.

CHEMISTRY

What new group of chemicals is effective in killing fungi? p. 89.

ETHNOLOGY

How many rabbit skins made up an Indian's Baby Bunting? p. 89.

GENETICS

How are fertilized eggs now being transplanted from one female rabbit to another? p. 91.

MEDICINE

How many iron lung centers will soon be in operation? p. 95.

PHYSIOLOGY

What is believed to be the secret of why people wake up? p. 92.

SURGERY

How do "light bulbs" help bad hips in aged persons? p. 88.

Photographs: Cover, U. S. Department of Agriculture; p. 83, U. S. Navy; p. 85, General Electric Company; p. 87, Western Union; p. 90, Mount Wilson and Palomar Observatories.

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GENERAL SCIENCE

Talent Search Winners

Forty most promising young scientists from the nation's high schools selected to compete in finals of the eleventh annual Search for talented youngsters.

► THE 40 most promising young scientists in America's high schools have just been selected in the Eleventh Annual Science Talent Search. The winners—nine girls and 31 boys—have been invited to Washington for a five-day all-expenses-paid visit Feb. 28 through March 3.

They will participate in the Science Talent Institute and compete for $11,000 in Westinghouse Science Scholarships in the finals of the Science Talent Search conducted by Science Clubs of America, administered by SCIENCE SERVICE.

The 40 trip-winners, 15 to 18 years of age, were chosen by a panel of judges after a nation-wide competition in which top-ranking seniors in all the public, parochial and private schools in the continental United States were invited to participate. Entrants, representing every state in the Union, totaled 14,886, of whom 2,114 completed the stiff science aptitude examination, submitted recommendations and scholarship records and wrote a report on "My Scientific Project."

At the end of the winners' five-day stay in Washington, Feb. 28 through March 3, the judges will award the scholarships. One boy or girl will receive the $2,800 Westinghouse Grand Science Scholarship ($700 per year for four years). The runner-up will receive a $2,000 Westinghouse Science Scholarship. Westinghouse Science Scholarships, ranging in size from $100 to $400 and bringing the total to $11,000, will be awarded at the discretion of the judges to the rest of the winners.

The scholarships may be used at any college, university or technical school of the winners' choice so that they may continue their training in science or engineering.

Many Areas Represented

Chosen without regard to geographic distribution, the 40 trip-winners come from 30 cities in 12 states and the District of Columbia. All of the states represented except Montana and Virginia have had a winner in previous Searches. The total of states that have been represented by winners since 1942 is 40.

Four high schools in the United States have produced more than one winner this year. Forest Hills (N. Y.) High School will send one boy and one girl. Two boys have been invited from each of these high schools: Central High School, Omaha, Neb., New Rochelle (N. Y.) High School and Mont Pleasant High School, Schenectady, N. Y.

Seventeen of the winners this year come from schools that have never before placed winners in the annual Science Talent Search. The other 23 among this year's winners are adding new laurels to schools already honored by winners in the past.

According to the records of the 11 years of the Science Talent Search, the standing of this year's "repeater" schools is: 17 have come from Stuyvesant High School, New York City; 16 from Bronx (N. Y.) High School of Science; 15 from Forest Hills (N. Y.) High School; seven from Abraham Lincoln High School in Brooklyn and five each from Midwood High School in Brooklyn and New Rochelle (N. Y.) High School.

Through the 11 years four winners have come from each of these schools: Evanston (Ill.) Township High School; New Brunswick (N. J.) High School; and Mont Pleasant High School, Schenectady, N. Y.

Through the 11 years these schools have produced three winners each: North Phoenix High School, Phoenix, Ariz.; Phillips Academy, Andover, Mass.; and Taft High School, New York City.

Two winners each have been produced in the 11 years by these schools: Tucson (Ariz.) Senior High School; Susan Miller Dorsey High School, Los Angeles, Calif.; Greenwich (Conn.) High School; Edwardsville (Ill.) High School; University High School, Urbana, Ill.; Central High School, Omaha, Neb.; Princeton (N. J.) High School; Far Rockaway (N. Y.) High School; and Poughkeepsie (N. Y.) High School.

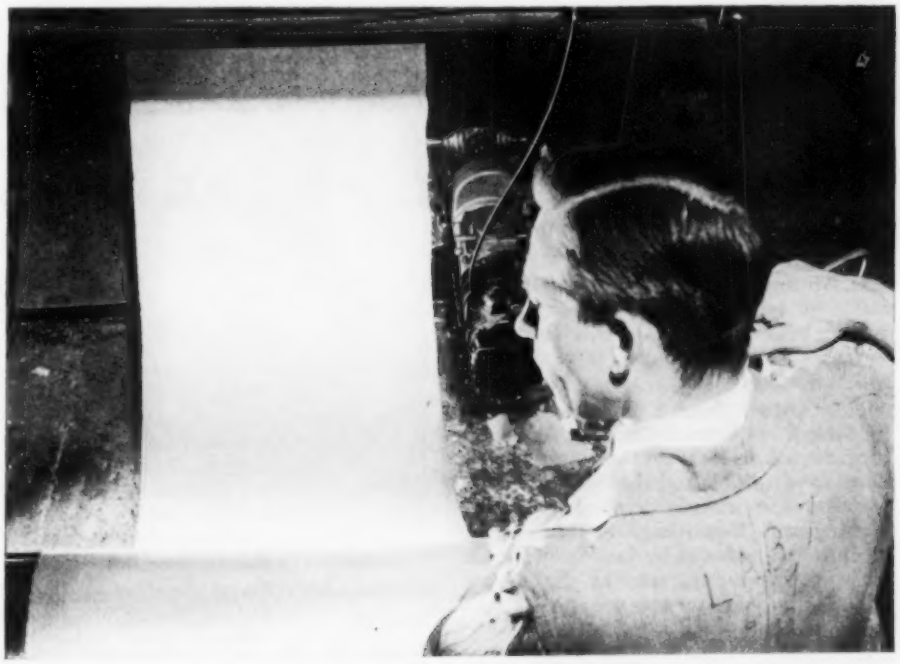
Each school, producing a winner, receives a bronze and walnut plaque to add to its trophy collection.

Diversified Backgrounds

Most of the winners live at home and attend their local or nearby public, parochial or private secondary schools. One attends a private school in another state.

Over half (63%) of the Science Talent Search trip winners rank first, second or third in their graduating classes, which range in size from 48 to 800 students. Approximately 85% of the winners' fathers and 58% of their mothers attended college. A number have parents who were born or educated abroad. One-half of the winners claim no scientists among their relatives; the other 20 have one or more scientists among their ancestors.

Contrary to a frequent conception of scientists, the winners are not interested in science only. While most of them spend much of their spare time in science pursuits such as science clubs and individual hobbies of a scientific nature, all of them have participated in varied extracurricular interests such as music, athletics, journalism and dramatics, and all belong to social and



CONTINUOUS SHEET MICA—Mica by the roll for electric insulation is now being made by General Electric Company. Domestic mica can be utilized in the special process that binds the tiny mica particles together.

educational organizations outside their school work.

Many of the top 40 have already chosen the lines of study they wish to pursue. Physics attracts 14, seven intend to study medicine, and seven lean toward careers in engineering. Others plan careers in mathematics, chemistry, biology, archaeology, psychology and biochemistry. All hope to do research in their respective fields.

Well over half of the 400 winners in the first ten Science Talent Searches, held since 1942, now have undergraduate degrees. Doctors degrees (M.D., Ph.D., D.Sc.) have been granted to 50 of the 400. More than 80 are now employed full-time in science jobs in industry, government or professions, or are on university teaching or research staffs. Sixteen are serving in the armed forces. None of the 400 previous winners is more than 29 years old.

Honorable Mentions

In addition to the 40 trip-winners, who will attend the Science Talent Institute in Washington, an Honorable Mentions list of 260 in the Eleventh Annual Science Talent Search was announced Feb. 7. These high ranking contestants will be recommended to colleges and universities for their aptitude in science. If they are as fortunate as those previously included in the Honorable Mentions list, they will receive offers of scholarships from many institutions of higher education seeking students with talent in science.

Through an arrangement with Science Clubs of America, 25 states are conducting state Science Talent Searches concurrently with the national competition. Eight of them have produced winners this year. In these 25 states all entries in the national Science Talent Search will be turned over to state judging committees. From their entries they will choose state winners and award scholarships to various colleges and universities within the state. Cooperating states are: Arkansas, Connecticut, District of Columbia, Georgia, Illinois, Indiana, Iowa, Kansas, Louisiana, Maine, Massachusetts, Michigan, Minnesota, Montana, New Hampshire, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Vermont, Virginia, West Virginia and Wisconsin.

The Annual Science Talent Search is conducted by Science Clubs of America, administered by SCIENCE SERVICE. Scholarships are provided and the Science Talent Search made financially possible by the Westinghouse Educational Foundation, an organization endowed by the Westinghouse Electric Corporation, for the purpose of promoting education and science.

Science Clubs of America is the international organization for science groups, in schools and out. Today more than 15,000 clubs are affiliated here and abroad, with a membership of more than one-third of a million young people.

GENERAL SCIENCE

STS Winners Selected

* indicates girls — HOME ADDRESS follows name of school
H.S. indicates High School — AGE of winner follows name

	ARIZONA	
Phoenix	*Eddings, Charlotte Ann	16 North Phoenix H.S. 44 W. Georgia Ave.
Tucson	Bideaux, Richard August	16 Tucson Senior H.S. 2521 E. 8th St.
	CALIFORNIA	
Los Angeles	Messinger, Paul Hilton	18 Susan Miller Dorsey H.S. 5423 Harcourt Ave. 43
	Epstein, Eugene Ethan	17 Hollywood H.S. 1914 N. Curson Ave. 46
Riverside	Richards, Paul Linford	17 Riverside Polytechnic H.S. 4455 Fifth St.
	CONNECTICUT	
Greenwich	Finch, Hardy Rundell, III	17 Greenwich H.S. 11 Lockwood Lane, Riverside
	DISTRICT OF COLUMBIA	
Washington	Hooker, William Weston	17 Anacostia H.S. 3385 Highview Terrace, S.E. 20
	GEORGIA	
Atlanta	Griswold, Ralph Edward	17 Northside H.S. 4791 Powers Ferry Road, N.W.
	ILLINOIS	
Edwardsville	Dietrich, Charles William	17 Edwardsville H.S. 1011 Minnesota Ave.
Evanston	Muench, Karl Hugo	17 Evanston Township H.S. 519 Greenwood St.
Skokie	Klevay, Leslie Michael, Jr.	17 Niles Township H.S. 8109 Laramie Ave.
Urbana	Potthoff, Robert Edward	15 University H.S. 608 Delaware St.
	INDIANA	
Bloomington	Noyes, Russell, Jr.	17 University H.S. 831 S. High St.
Connersville	*Dawson, Mary Ann	17 Connersville Senior H.S. 2147 Virginia Ave.
	MASSACHUSETTS	
Andover	Luhrmann, George William, Jr.	17 Phillips Academy Blue Anchor Road, Cedar Brook, N.J.
Springfield	Hobbie, Russell Klyver	17 Technical H.S. 82 Mapledell St. 9
	MONTANA	
Livingston	*Allen, Patricia Joan	17 Park County H.S. Box 517
	NEBRASKA	
Omaha	Blanchard, Byron Elbert	16 Central H.S. 5514 Marcy St. 6
	Papadakis, Emmanuel Philippos	17 Central H.S. 2774 Burt St. 2
	NEW JERSEY	
New Brunswick	Hartmann, Harry Rodney	17 New Brunswick H.S. 15 Lawrence St., Milltown
Princeton	Braden, Robert Taylor	18 Princeton H.S. Littlebrook Road
	NEW YORK	
Brooklyn	Lieberman, Philip	17 Abraham Lincoln H.S. 2816 Cortland St. 24
	*Shimansky, Judith Martha	16 James Madison H.S. 1656 E. 12th St. 29
	Berne, Joel Edward	17 Midwood H.S. 860 E. 15th St. 30
Far Rockaway	Colman, Robert Wolf	16 Far Rockaway H.S. 309 Beach 143 St., Neponsit, L.I.
Forest Hills	*Laufer, Wilma Phyllis	17 Forest Hills H.S. 92-10 68th Ave.
	Weiss, Bernard	15 Forest Hills H.S. 65-44 110th St. 75
Mount Vernon	*Beck, Alice Eve	17 A. B. Davis H.S. 346 Egmont Ave.
New Rochelle	Forman, Paul Frederick	17 New Rochelle H.S. 106 Petersville Rd.
	Mitchell, Dana D.	18 New Rochelle H.S. 99 Hill St.
New York	Dolen, Richard	16 Bronx H.S. of Science 1710 Montgomery Ave. 53
	Raudsep, Ilmar	18 Stuyvesant H.S. 1125 Wyatt St. 60
	*Schmir, Louise	16 Taft H.S. 1755 Weeks Ave. 57
Oceanside	Seaman, John Robert	15 Oceanside H.S. 99 Park Ave., Baldwin
Poughkeepsie	*Boat, Mary Barbara	18 Poughkeepsie H.S. 5 Mitchell Ave.
Rochester	McLeod, Donald Wingrove	16 John Marshall H.S. 1549 Ridge Road West 13
	Goldstein, David Arthur	17 Monroe H.S. 51 Argyle St. 7
Schenectady	Armstrong, John Allan	17 Mont Pleasant H.S. 1121 Willett St. 3
	Smith, David Young	17 Mont Pleasant H.S. 970 State St. 7
	VIRGINIA	
Norfolk	*Harrell, Ruth Flinn	18 Maury H.S. 6411 Powhatan Ave.

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The judges of the Science Talent Search are: Dr. Harlow Shapley, director of the Harvard College Observatory and president of SCIENCE SERVICE; Dr. Harold A. Edgerton, vice president, Richardson, Bellows, Henry & Co., New York City; Dr. Steuart Henderson Britt, vice-president and director of research, Needham, Louis and Brorby, Inc., Chicago; and Dr. Rex E. Buxton, psychiatrist, of Washington, D. C. Drs. Edgerton and Britt design the aptitude examination each year.

Complete details of the national and the 25 State Science Talent Searches are available from Science Clubs of America, 1719 N St., N. W., Washington 6, D. C.

Science News Letter, February 9, 1952

METEOROLOGY

Weather Pattern to Be Reversed during February

➤ THE WEATHER pattern over the nation for February will be almost exactly the reverse of what it was in January. This is the prediction of the U. S. Weather Bureau's Extended Forecast Section.

The weathermen expect that, whereas the East averaged warmer than normal during January, it will be colder than normal in February. Lowest temperatures, as related to what usually happens, can be expected in the Ohio Valley and the Southeast.

Similarly, west of the Continental Divide there will be warmer weather than usual during February. In a belt running from the Dakotas to Texas, the temperatures will average about normal.

Rain and snow amounts will also change around. More than usual is expected in the eastern Gulf states and along the Atlantic seaboard. Less than usual amounts of snow and rain are predicted during February in the Great Lakes region, the northern plains and over the Southwest. Elsewhere about the usual amounts are expected.

The cold weather will come down from the Arctic Ocean propelled by an anticyclonic movement of the winds aloft. It will move alongside of a dip to the north in the west-to-east wind current over the United States between 10,000 and 30,000 feet up.

This anticyclone — a counterclockwise whirling of wind currents—is what made the weather pattern during the past two months remarkably similar to the same months in 1949-50. However it is now much farther north than its older brother went two years ago.

Science News Letter, February 9, 1952

BIOPHYSICS

Food Without Plants

Attempt is being made to convert solar energy into usable chemicals by photosynthesis outside the living cell, AEC's Eleventh Semiannual Report reveals.

See Front Cover

➤ AN ATTEMPT is being made as a part of the atomic energy program to make photosynthesis, the conversion of solar energy into usable chemicals, take place outside the living cell.

The University of Utah, under an AEC grant, is engaged in this task, the Commission's Eleventh Semiannual Report presented to Congress reveals.

Plant extracts containing chlorophyll, the green matter of plants, are obtained by applying high pressure to plant material. Previously it was demonstrated that such cell-free extracts can split water into hydrogen ions and release oxygen gas. But all attempts to make them convert carbon dioxide into carbohydrates, as the plants do, have failed. This is the second part of the photosynthetic process. In other laboratories other investigators also are at work on this problem.

There is the possibility of practical applications of this process outside the plant, if it can be accomplished. Scientists foresee the production of food in the future without the aid of the living plant if photosynthesis of this sort is achieved. This may transfer agriculture to food factories in the future.

DESK COMMUNICATION — The Desk-Fax machine gives fast city-to-city Western Union service. Messages are sent and received on specially prepared, electrically recording blanks. *(See SNL Feb. 2, 1952, p. 68.)*

Discovery of the first compounds that are produced in photosynthesis in living plants has been made in experiments at the University of California Radiation Laboratory, the AEC report says.

By use of radioactive carbon in the carbon dioxide fed to living cells, and a chromatographic analysis of the products of only two seconds exposure to light, the Berkeley group determined that the first stable organic compound a plant produces in photosynthesis is phosphoglyceric acid, which contains three carbon atoms and one phosphorus atom and oxygen and hydrogen. When the light exposure is slightly longer, a chain of reaction is set up that leads to the formation of sugars and other compounds essential to plant life. Second, the plants produced triose phosphates, with three carbon atoms, then fructose phosphates with six carbon atoms.

When photosynthesis has proceeded only two minutes, numerous amino acids needed for protein building and even proteins and fats are produced.

Experiments with radioactively tagged phosphorus are also yielding valuable information about plants. Scientists are learning how conventional fertilizers can be used more efficiently and economically. With radioactive isotopes, nutrients can be traced through the soil, into roots and through plants and to measure the speed of such movement as well.

The U. S. Department of Agriculture at Beltsville, Md., operates a central mixing plant for incorporating tracer isotopes in ordinary fertilizers. On the cover of this week's SCIENCE NEWS LETTER is S. B. Hendricks, shown weighing radioactive phosphate from the atomic pile at Oak Ridge to be compounded into a fertilizer.

American farmers spend 750 million dollars a year for commercial fertilizers. Until recent years, the effects of fertilizers could be told only by comparing measurements of the growth, bulk and yield of fertilized crops. It is believed that research with isotopes has gained more new knowledge of phosphate fertilizers in the last four years than had been gained in many years of other studies, the AEC reports. The U. S. Department of Agriculture, the various state experiment stations and the AEC cooperate in the fertilizer research program.

Science News Letter, February 9, 1952

Winter sprays which destroy large numbers of insect eggs are proving good insurance against *insect* injury the next season.

SURGERY

Operations Within Hour Are Saving Many Wounded

➤ MANY SOLDIERS in the Korean fighting owe their lives to the fact that they were operated on within an hour from the time they were wounded, Dr. Harold B. Boyd of Memphis, Tenn., declared at the meeting of the American Academy of Orthopaedic Surgeons in Chicago.

Dr. Boyd, who is secretary of the Academy, reported his recent observations of hospital and medical centers in Japan and Korea made while serving as civilian consultant for the Office of the Surgeon General of the Army.

He praised the doctors, nurses and helicopter service for a heroic, life-saving job.

"The helicopters," he said, "usually carry two patients and land within a few yards of the clearing stations and hospitals. In extreme emergencies some of the wounded were observed arriving from the front by helicopter in less than 30 minutes from the time of wounding. In some cases, when necessary, these patients were examined, transfusions given, X-ray films made, given anesthesia, and the operation started within 30 minutes of the time they arrived at the hospital. Many soldiers owe their lives to this rapid transportation and immediate medical care.

"Mobile Army Surgical Hospitals are located near the front and can be moved 'like a circus' with a few hours' notice," Dr. Boyd said. "Equipment literally 'melts' into trucks and they are off. After reaching a new location, the hospitals can be set up and patients received within two or three hours. The hospitals in Korea are housed in permanent structures, such as schools and prefabricated units. Sometimes, tents are used."

Science News Letter, February 9, 1952

GEOLOGY

Malaspina Glacier Actually Flows Uphill

➤ MUCH OF Malaspina Glacier in southern Alaska actually flows uphill, geologists at the California Institute of Technology in Pasadena have concluded from studies to determine the flow mechanism of ice sheets.

This is reported by Dr. Robert P. Sharp, professor of geomorphology and leader of a five-man team in Project Snow Cornice, sponsored by the Arctic Institute of North America. The researchers found that the rock floor under the center of the glacier, which covers more than 1,000 square miles, slopes back inland toward the St. Elias Mountains to the north. Their observations were made with seismic equipment along a ten-mile line running north and south.

To make the study they set off small charges of dynamite in shallow holes in the ice, and with seismic equipment recorded the shock waves reflected back from the rock floor. Knowing the velocity of the waves through ice and the time it took them to make a round trip, the geologists could then calculate how far the waves had traveled.

Their measurements indicated that the ice thickness along the ten-mile line ranged between 1,130 and 2,075 feet. They also showed that the floor under the glacier center was at least 685 feet below sea level, whereas it rises above sea level at the glacier's outer edge.

In an effort to solve the problem of how the Malaspina Glacier moves, the researchers sank a vertical hole 1,000 feet deep into the ice sheet and left the drill pipe in the hole. Since mechanical drilling equipment is not suitable for ice work, they bored into the sheet with an electrically heated hot point—a gigantic soldering iron.

The researchers expect the drill pipe to be bent by the moving ice and its degree of bending to be different at different depths within the glacier. Measuring the various degrees of deformation with an instrument known as an inclinometer, they will be able to construct a vertical velocity profile for the ice sheet and thus tell how the glacier moves.

Science News Letter, February 9, 1952

MEDICINE

Food Tube Completely Stopped by Laxative Pills

➤ COMPLETE OBSTRUCTION of the esophagus, tube down which food is swallowed into the stomach, by three methylcellulose tablets taken for constipation is reported by Dr. Morrison H. Belmont of San Francisco in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Feb. 2).

No similar case has been reported in medical publications.

The patient was a 67-year-old man who came to the hospital complaining of a choking sensation and inability to swallow comfortably after taking the three pills.

Efforts to suck or flush the pills out through a special instrument, the esophagoscope, failed. The doctor had to remove the gelatinous mass bit by bit with a forceps.

After this the patient had no more choking or smothering sensations.

Science News Letter, February 9, 1952

INVENTION

Hands Free for Make-Up With Body-Supported Mirror

➤ MYRTLE A. AMER, Long Beach, Calif., received patent number 2,583,803, for a body-supported mirror holder device. With this invention, a woman may make up her face with both hands, since it would be no longer necessary to hold a hand mirror with one hand. It consists of a frame which hangs around the neck.

Science News Letter, February 9, 1952

IN SCIEN

SURGERY

"Light Bulbs," Aid Bad Hips in Aged

➤ PLASTIC AND metal devices shaped like light bulbs and door knobs are now helping aged persons with bad hips due to breaks or disease.

The "light bulb" was designed by Dr. J. E. M. Thomson of Lincoln, Nebr., who himself has a hip disability from an accident in his youth. He announced the new device at the meeting of the American Academy of Orthopaedic Surgeons in Chicago. He has tried it on 55 patients with an average age of 70, the oldest being 94. The "light bulb" works smoothly and painlessly, he reported.

"Surprisingly satisfactory" results were reported for the "door knob" by Dr. Earl D. McBride of Oklahoma City. All but three of 23 patients fitted with this device to replace their own hip bone have good free hip motion, Dr. McBride told the surgeons, many of whom were skeptical when he described the device at the meeting last year.

Patients have worn the device for from one to three years. Only three report any pain other than mild soreness.

Science News Letter, February 9, 1952

INVENTION

Silica Gel Grease Made Waterproof for Marine Use

➤ A NEW kind of waterproof lubricating grease, for use on ships and wherever moisture might decrease the efficiency of ordinary grease, has been developed.

Two Canadian inventors, Aurelio F. Sirianni and Ira E. Puddington, of Ottawa, have assigned their five patents on the new kind of grease to the Canadian Honorary Advisory Council for Scientific and Industrial Research. They received American patents number 2,583,603 through number 2,583,607.

Most lubricating greases made with a silica gel, the inventors say, have an affinity to water. Any water which comes in contact with the lubricating grease tends to replace the oil content in the grease. The inventors have stopped this process by waterproofing the silica gel with certain alkyd resin components.

The two inventors have also improved the process of making lubricating grease from an aqueous gel by finding a way in some cases to cut out some of the various steps previously necessary in replacing the original water in the gel with the oil used in the grease.

Science News Letter, February 9, 1952

ENE FIELDS

AERONAUTICS

Improved Automatic Pilots For Accurate Bombing

➤ MORE ACCURATE bombing by fast-flying jet airplanes is now possible, using improved automatic pilots, much faster in their reaction time than those for World War II aircraft.

As recently as three years ago, the bombardier of a high-speed airplane had to start his run so far from the attack target that his accuracy in aiming was affected. The automatic pilot just did not react fast enough to allow him to change his heading if he waited to get a more definite "bead" on the target. Now the time needed to complete such a change in direction has been cut in half, Boeing Airplane Company, Seattle, has stated.

The added maneuvering time also allows for better evasive action from enemy guns. Quickening of the automatic pilot's response time is the result of a joint research program conducted by Boeing and manufacturers of automatic pilots.

The job of an automatic pilot on a bomber is much more complex than on an airliner, requiring abrupt turns and steep bank angles. Automatic pilots for commercial planes are designed to change course gradually, so that little motion can be felt by the passengers.

Science News Letter, February 9, 1952

ETHNOLOGY

60 Rabbitskins for Indian "Baby Bunting"

➤ THE PRIMITIVE Chippewa Indian baby was a real "Baby Bunting." He was wrapped in a rabbitskin blanket woven from inch-wide strips made by cutting round and round the animal fur. From 60 to 70 skins were used in such a blanket.

The baby's first moccasins had a hole "about the size of a blueberry" cut in the ball of the sole or in the heel so that when he grew up he would work hard enough to wear out his moccasins.

These are among the Chippewa customs of child care collected by Sister M. Inez Hilger, of St. Benedict's Convent, St. Joseph, Minn., in a study conducted over several years. Sister Inez interviewed old people of the tribe who had good memory for the old customs and younger men and women who had been brought up by grandparents and so learned the old primitive ways. Report of the findings is published by the Smithsonian Institution.

Baby's first step was an event for rejoicing among Chippewa parents, as it is among modern Americans. When the child first walked alone at least half the length of the wigwam, a feast was given. When the baby walked alone to the neighbors for the first time, the neighbors visited gave a feast.

Belief in prenatal influences on the children was strong among the Chippewa. A freckle-faced baby, it was believed, was born to a mother who had eaten sea-gull eggs before the birth. Cry-babies were thought to be born to mothers who had eaten blackbirds or robins. Eating porcupine caused the baby to "have a stuffy nose," to be clumsy or crippled, clubfooted or pigeon-toed. Porcupine also made the baby touchy for "the needles of the porcupine are sharp."

Science News Letter, February 9, 1952

SURGERY

Deformed Hands Remade By New, Safer Operation

➤ A SAFER operation for correcting a certain type of hand deformity was announced by Dr. H. van H. Thatcher of Portland, Oreg., at the meeting of the American Academy of Orthopaedic Surgeons in Chicago.

The operation is for the kind of hand deformity in which the fingers are drawn into the palm.

This condition of contracted fingers occurs mainly in men past 40 years of age. Previous operations for correction of the condition often left the patient with a troublesome scar in the palm of his hand.

Dr. Thatcher found that if multiple incisions are made in the natural creases of the palm the patient can escape the disfiguring result. Also, he explained, the surgeon, by following the natural creases, can with more ease and safety cut away the contracting diseased tissue below the skin, thereby causing little or no disturbance to the natural circulation.

The new operation has now been performed on 171 patients.

Science News Letter, February 9, 1952

CHEMISTRY

New Chemical Family Kills Plant Fungi

➤ A NEW group of chemicals effective in killing fungi on plants, such as late blight of tomatoes and late blight of celery, has been developed by Wm. E. Rader, C. M. Monroe and R. R. Whetstone of the Shell Agricultural Laboratory at Modesto and Shell Development Co. at Emeryville, Calif.

The chemicals are called alkyltetrahydropyrimidines. In preliminary tests in the laboratory and greenhouse they show high fungistatic value making them worthy of further testing as foliage fungicides.

Results of these tests are reported in the journal SCIENCE (Feb. 1).

Science News Letter, February 9, 1952

PSYCHOLOGY

Children Growing Up Now Are Made Anxious

➤ CHILDREN GROWING up in this time of worries, international tensions and threats of total war and total destruction are more seriously disturbed and anxious than is generally realized. This is the warning given by the yearbook of the National Education Association, "Growing Up in an Anxious Age."

Children in today's schools may be guided by teachers who are themselves anxious, the book points out. Teachers are under tension because they are pressured from all sides. They must individualize instruction, but they must do it in large classes of 35 or more. They must use "democratic" methods but "they must not let children 'get out of hand' or, for that matter, out of their seats."

Nevertheless, adults should not project their own anxieties onto their children, the educators point out. Older people have to un-learn and re-learn in order to keep up with changing attitudes and are likely to become anxious in the face of so much change. But what is new to the elders may be all that the children have ever known.

Yesterday's children went out to play war against redskins, armed with their trusty beanshooters. Today's youngster, if he eats his breakfast cereal, may be armed with an Atomic Ray Gun and he is opposed by strange creatures crawling out of interstellar space. But the motives and emotions that lie behind the child warfare then and now are "as timeless as the restless urges of youth."

Science News Letter, February 9, 1952

ENTOMOLOGY

Breed Good Insects To Resist DDT Death

➤ HELP FOR farmers trying to use DDT to destroy unwanted insects without at the same time destroying the useful ones is coming from experiments by D. P. Pielou and R. F. Glasser of the Dominion Parasite Laboratory at Belleville, Canada.

They are breeding DDT resistance into an effective parasite of the larvae of the oriental fruit moth. By this means they hope to be able to keep the parasite's ability to destroy the fruit moth larvae at the same time that DDT is used for insect pest control.

The DDT resistance of the parasite, *Macrocentrus ancylivorus* Rohw., has now been increased more than four times for the females and more than three times for the males. While these results are "promising," the scientists state in their report to the journal SCIENCE (Feb. 1) that they do not plan to release any DDT-resistant parasites until the resistance has "been increased to the practical limit."

Science News Letter, February 9, 1952

ASTRONOMY

Dozens of Moons

Sun's family of moons includes not only our moon, but 30 others circling other planets, a few larger than our own moon. Jupiter leads with twelve moons.

By MARTHA G. MORROW

➤ NOT ONE, but 31 moons shine in the heavens. There may be even more, but a score or more have been seen from here on earth.

The large moon that circles the earth is almost always visible. Sometimes only a tiny crescent can be seen faintly; at other times the moon's full disk brightens the sky. The moon is the largest and brightest thing in our night sky.

The sun's family, however, includes other moons circling other planets. A few are even larger than our own moon. But they are so far away they were unnoticed by early man and have only been discovered within recent centuries.

Four of the moons swarming around the gigantic planet Jupiter can be spotted with a good pair of binoculars. A small telescope is needed to pick up the largest of Saturn's moons. The world's largest telescopes were used to spot a few, including a half-dozen small satellites of Jupiter less than 20 miles across. All these moons shine by reflected sunlight and sometimes appear as full disks, sometimes as half-moons.

Four at One Time

Some 340 years ago the Florentine physicist Galileo Galilei turned his telescope, the first to be used on the sky, toward giant Jupiter. In one evening he saw for the first time in history four of Jupiter's bright satellites. Thus were discovered the first satellites other than the earth's moon. One is smaller, the other three larger than our moon.

Galileo's record for discovering Jupiter's moons was equalled this fall when Dr. Seth B. Nicholson of the Mount Wilson and Palomar Observatories of California Institute of Technology and Carnegie Institution of Washington spotted his fourth tiny satellite for Jupiter. Almost 40 years elapsed between Dr. Nicholson's first and most recent discovery.

Neither Galileo nor Dr. Nicholson could be sure at first that the objects they found were Jupiter's satellites. Galileo thought perhaps he was seeing stars that happened to appear close to the planet. But nightly records of the positions of these bright objects convinced him that they were circling Jupiter.

Dr. Nicholson feared he might be mistaking an asteroid or an already familiar satellite for a new moon. Detailed calculations of the orbits of the other small satellites, however, and further study of the new object persuaded him and other astronomers that he had indeed found a 12th satellite for Jupiter.

The new satellite takes almost two years to circle Jupiter. It is one of the outer four satellites that move about 14,000,000 miles from the planet. Thus it is one of the most distant of all moons from its planet.

Two other astronomers are also credited with finding four moons. Giovanni Domenico Cassini, director of the Paris Observatory, before 1685 found four moons for Saturn, famous for its rings. Britain's famous astronomer William Herschel in the 1780's spotted two more moons of Saturn and two of the planet Uranus, which he discovered.

The 31 grandchildren of the sun, satellites that circle planets which in turn move around the sun, were formed in a wide variety of ways, reasons Dr. Gerard P. Kuiper of Yerkes Observatory of the University of Chicago.

Our moon eons ago probably was formed as a twin planet with the earth, Dr. Kuiper states. The moon is 2,163 miles across, thus its diameter is over a quarter as great as that of the earth around which it moves.

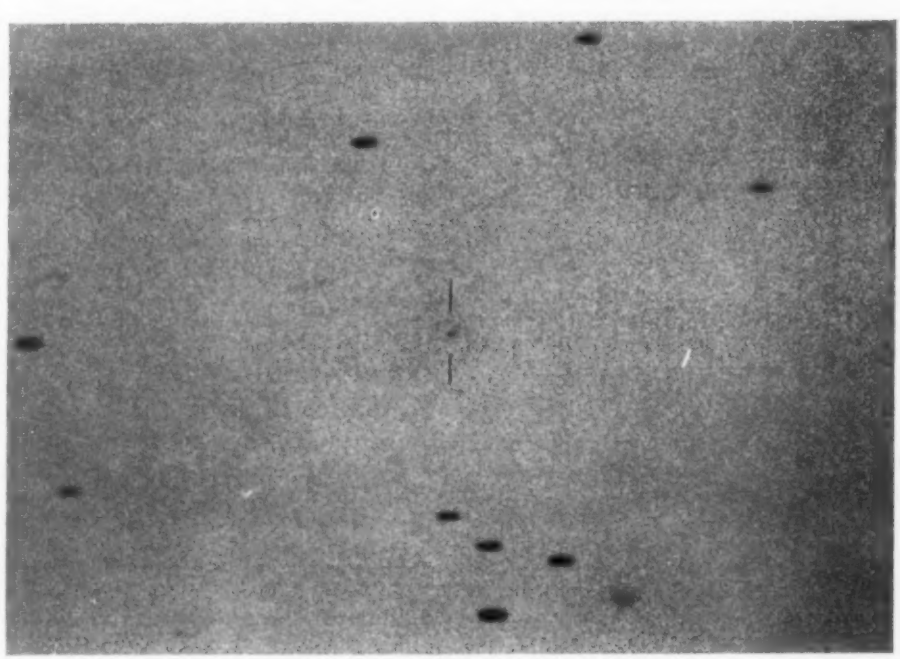
The moon's mass is one eighty-first of the mass of the earth, much greater than that of any other satellite in relation to its parent planet. The largest of the other satellites, and planets which serve as satellites to the sun, is less than one thousandth of its parent body.

The 30 other satellites probably were created as off-shoots of their parent planets. Some 19 of them have continued to swing around their planets, moving in fairly circular orbits and going in the same direction as the planets rotate. But a dozen or so escaped in their youth.

Some Satellites Recaptured

Those satellites that tore loose probably continued to move around the sun along pretty much the same path as their parent bodies, Dr. Kuiper believes. Sooner or later some of them were bound to come close to their parent planets and be recaptured.

After their recapture, about half the satellites moved in a direction opposite to that in which they originally circled the planets. This is the reason that today some of the moons of Jupiter, Saturn and Neptune circle



MOST RECENT FIND—Part of the discovery plate of Jupiter XII, enlarged five times from the original. Because the plate was oriented parallel to the ecliptic, the apparent path of the sun, the star trails appear horizontal. The photograph was taken with the 100-inch Hooker telescope by Dr. Seth B. Nicholson of Mount Wilson and Palomar Observatories.

their planet in one direction while others go the opposite way.

Though seven irregular satellites are now known for Jupiter, they may actually represent only two recaptures. Two moons may have split into several parts to form the tiny satellites seen circling that giant planet today.

Some May Be Asteroids

Some of the other satellites Jupiter shed in its youth may never have been recaptured, Dr. Kuiper states. They may still circle the sun as the outermost asteroids. A dozen such bodies move around the sun as far away from it as Jupiter. One peculiar object, Hidalgo, the most distant of the asteroids, travels between the orbits of Jupiter and Saturn.

Only one satellite has ever been known to move around the earth, but some day the earth may have a second moon, created by scientists. The possibility of sending a satellite missile some 600 miles or so above the earth's surface to swing continually around our planet has been considered seriously.

Such a missile would carry scientific instruments needed to collect data about the rarefied atmosphere surrounding the earth. Once started, no fuel would be needed to keep it circling around our planet.

Life as we know it is considered impossible on any of the 31 moons. Only one of them, Saturn's Titan, is known to have an atmosphere and that is composed of methane.

Our moon is the sun's nearest granddaughter because no satellites have ever been found moving around Mercury and Venus, the two planets nearest the sun. This is because tidal friction by the sun kept them from acquiring the necessary rapid motion, Dr. Kuiper's work on the origin of the solar system shows.

Mars, our near-neighbor in space, has two tiny satellites. One is ten miles across, the other about five. The one nearer the planet skims around keeping within 4,000 miles of the surface of Mars. It travels around Mars several times each day, and thus rises in the west and sets in the east. The other moon keeps almost 15,000 miles away from Mars and travels so slowly two Martian days pass between its rising in the east and setting in the west.

Jupiter has more satellites, gigantic and tiny, than any other planet. Seven of the full dozen now known were spotted on photographs within the last 50 years.

Saturn also has a large number of moons. It has nine in all. Its inner five move in nearly circular orbits and travel almost in the same plane as its rings.

Five Moons for Uranus

The planet Uranus was discovered in 1781 by William Herschel, and within ten years he spotted two of its moons. One is about 1,000 miles across and the other 800 miles in diameter. Two other satellites for Uranus, smaller and nearer the planet, were found some 65 years later. A fifth was discovered by Dr. Kuiper about three years ago.

Neptune was located in 1846 because Uranus seemed to be pulled by an invisible object out of its calculated path around the sun. In less than a month after the planet had been discovered, W. Lassell, an English astronomer, found its large satellite, probably as large as our moon. Another satellite was spotted by Dr. Kuiper in May, 1949.

Pluto, itself not known until two decades ago, has no known moon in spite of recent searches with large telescopes.

It is not impossible, however, that one or two very faint satellites may still be added to the 31 known moons of our solar family.

Science News Letter, February 9, 1952

GENETICS

Rabbit Egg Transplants

► MORE KNOWLEDGE of factors affecting cancer and other kinds of growth is expected from a rabbit egg transplantation method developed at the Jackson Memorial Laboratory, Bar Harbor, Me.

The method makes it possible for the first time to transplant fertilized eggs from one female rabbit to another without sacrificing the donor animal. It was worked out by Frederick R. Avis, director of the secondary training school program of the Jackson Laboratory and head of the science department at St. Marks School, and Dr. Paul B. Sawin, research associate at Jackson Laboratory.

Because the rabbits are all inbred to produce certain inherited characteristics, it will be easier to determine what changes occur in the uterus during the embryo's development. In addition, scientists will be able to tell how factors in the uterus, apart from inherited factors, affect the animal. Whether cancer susceptibility results from a trait in the fertilized egg or whether it comes from factors in the uterus during the embryo's development, for example, might be determined through this new technique.

The method, as reported to fellow scientists in the JOURNAL OF HEREDITY (Sept.-Oct., 1951), is to perform a Caesarian operation on the pregnant rabbit, remove the fertilized eggs and transfer them to a doe which has been prepared for proper reception of the eggs by a previous dose of gonado-trophic hormone which produces ovulation. The transplanted eggs develop in the host uterus. Normal rabbits develop from 81.3% of the transplants. The donor does can be saved for further study.

Science News Letter, February 9, 1952

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NATURAL RESOURCES

Discover Atomic Mineral In Southeastern States

➤ EXTENSIVE NEW discoveries of monazite, mineral containing thorium, extending 700 miles through the southeastern states have been made by Dr. John B. Mertie, of the U. S. Geological Survey.

The exact extent of the deposits of this granite-contained mineral is not available because of the importance of thorium as atomic energy raw material. Thorium can be converted into a fissionable sort of uranium by neutron bombardment and thus supplement uranium-derived atomic bomb material.

A whole new belt of deposits was discovered by Dr. Mertie. This ranges 250 to 300 miles from not far south of Washington to Columbia, S. C., and a known belt westward in North and South Carolina has been extended for 450 miles northeastward into Virginia and southwestward into Alabama. Monazite occurs in granite and weathers out into placer deposits from which it can be mined.

Science News Letter, February 9, 1952

PHYSIOLOGY

Why People Wake Up Believed Discovered

➤ THE SECRET of why you wake up in the morning or why you can't go to sleep at night is thought to have been discovered by Dr. Horace W. Magoun and associates at the University of California at Los Angeles Medical School and the Long Beach Veterans Administration Hospital.

"The waking mechanism of the brain," Dr. Magoun finds, "seems to be located in the central core of the brain stem, located at the top of the spinal column.

"The brain is known to emit electrical discharges called 'brain waves'. They have definite characteristics in both wakefulness and sleep. When awake, laboratory animals are found to emit fast waves of low amplitude; when asleep, they emit slow waves of high amplitude."

Controlling the central core of the brain stem, Dr. Magoun could induce wakefulness by activating it, abolish wakefulness by destroying it, and increase its electrical discharge by stimulating it through sensory inflow.

Associated with Dr. Magoun in the experiments have been Dr. Giuseppi Moruzzi of the University of Pisa, Italy, Dr. D. B. Lindsley and Dr. J. D. French of U. C. L. A., and Tom Starzl, a Northwestern University medical student.

The studies were maintained by a grant from the Commonwealth Fund and are being continued at the Long Beach Veterans Administration Hospital where Dr. E. V. Edwards, hospital manager, has long supported such activities.

Science News Letter, February 9, 1952

ZOOLOGY

NATURE RAMBLINGS

Befriended by Foes

➤ COYOTES, zoologists tell us, are not only present over most of their pre-settlement range, but have actually extended it, even appearing on the outskirts of rather large cities.

Despite the lack of welcome they receive from civilized man, these little wolves of the prairie find it profitable to hang around his settlements and ranches, where they can snap up poultry, lambs and shoats, and feast on carrion and garbage.

There is a certain element of justice in this. When the white man pushed his frontier out into the West, he not only killed all the coyotes he could shoot, trap and poison, but he destroyed a major part of the natural food of those who were crafty and hardy enough to survive direct attack, by killing or driving away most of the game and plowing up the sod where swarming rodents nested. So if a coyote steals a few hens he is only getting even for the loss of an equivalent weight in prairie-dogs, field-mice and grasshoppers.

There is one factor in the spread of the coyote east of the Mississippi during recent decades that is often overlooked. The coyote is naturally an animal of the plains and prairies; he is not at home in the timber.

When the white man came, most of the East was heavily forested. Settlers cut and burned the trees to make way for farms. This huge-scale clearing, which had much to do with the disappearance of the timber-wolf, meant simply an extension of the prairies to the coyote. So he has been moving in. And if the farmer supplies him with occasional poultry and piglets, so much the easier is life.

The coyote is by no means the unmitigated thief and general pest that he is sometimes pictured by exasperated victims of his raids. His principal diet still consists of small rodents, which in the aggregate devour a great deal more of the farmer's or rancher's substance than a few furtive predators are likely to get away with.

Also, by cleaning up the carcasses of animals dead of accident, disease or exposure, the coyote performs a direct service. Moreover, he is musical. Many a rancher who plots his destruction by day, will admit by campfire light that "he kinda likes to hear the old cuss howl."

Science News Letter, February 9, 1952

PHYSIOLOGY

Warn of Eye Disease

➤ THE LEADING cause of blindness among grown people in the United States is a disease called glaucoma. Glaw-koma is the way to pronounce it. One out of every eight blind persons is a victim of glaucoma.

Most people with this eye disease can be saved from blindness if proper treatment is started early in the course of the disease. But unfortunately, many do not know they have glaucoma.

The best defense against the disease is a thorough eye examination at least once every two years after you reach the age of 40, the National Society for the Prevention of Blindness advises. This is because the disease strikes after age 40 in most cases, and comes on slowly without many symptoms in the early stages.

Warning signals which may mean glaucoma are: 1. frequent change of glasses, none of which is satisfactory; 2. inability to adjust the eyes to darkened rooms such as theaters; 3. loss of side vision; 4. blurred or foggy vision; 5. rainbow-colored rings around lights. Any of these may also be caused by less serious eye trouble. But because they may mean glaucoma, they should signal you to see your doctor at once, without waiting until time for the next two-year check.

Here is an explanation, from the National Society for the Prevention of Blindness, on how glaucoma destroys sight:

The eyeball is shaped much like a basketball. But instead of air, a thick, jelly-like fluid fills most of the eyeball to give it shape. During the first stages of glaucoma, the pressure of this fluid mysteriously increases and pushes against the retina. In this way the retinal nerves are damaged and sight is gradually lost, with side vision the first to go.

In treating glaucoma, the doctor uses either an operation or drugs, and sometimes both, to reduce pressure in the eyeball. There are two types of glaucoma; the acute type which strikes suddenly; the chronic type, which is far more common and works slowly and painlessly.

Science News Letter, February 9, 1952

PUBLIC HEALTH

Plan Outlawing Heroin

International pharmacologists advocate replacing heroin, favorite of drug addicts, with other safer drugs. Heroin still used medically in some countries.

➤ DRUG ADDICTS throughout the world will have an increasingly harder time getting their favorite drug, heroin, thanks to the efforts of the pharmacologists who make up the World Health Organization's Expert Committee on Drugs Liable to Produce Addiction.

U. S. member of this committee is Dr. N. B. Eddy of the National Institutes of Health.

Heroin, the international pharmacologists believe, should be replaced for medical purposes by other, safer drugs. The committee recommended that WHO's executive board take steps to approach again countries in which it is still used for medical purposes to see whether these countries can do without the drug.

Similar action by WHO has resulted in 50 member states discontinuing or stating they are willing to discontinue the medical use of heroin.

Surprising and heartening to the committee was the change on the part of the Swiss with regard to heroin. For many years Swiss medical scientists had insisted they could not do without heroin because of the large number of tuberculosis patients coming to their country for treatment. Heroin was formerly greatly valued by doctors the world over because of its effect in controlling coughing. Now the Swiss are convinced that heroin is no longer necessary for this purpose and that they can do without it.

Heroin, Dr. Eddy explained, is no better for relieving coughs than codeine. Both are morphine derivatives, but codeine has less addiction liability and is also safer than heroin from the standpoint of overdosage.

Besides heroin, 13 of some 15 new synthetic pain-relieving drugs should be under international control, the committee recommended. These drugs belong to the pethidine, methadone and morphinan types.

The barbiturate sleep-inducing drugs are being produced in increasing quantities in several countries, often in excess of the amount needed for medical purposes. To guard against the danger of misuse and abuse of these drugs, the committee recommended that: 1. they should be dispensed only on a doctor's prescription; 2. each prescription should specify the number of times it can be refilled; 3. the prescriptions should be recorded.

Members of the Committee besides Dr. Eddy who were at the meeting in Geneva are: Dr. J. Labarre, Belgium; Dr. G. Joachimoglu, Greece, who was chairman of the group's latest meeting; Col. Sir Nam Nath Chopra, India; Dr. B. Lorenzo Velasquez, Spain; Dr. H. Fisher and Dr. F. Verzar, Switzerland; and Dr. J. Nicholls, United Kingdom.

Science News Letter, February 9, 1952

CHEMISTRY

New Plastics, New Uses

➤ THE WORLD is not alone plastic in the sense that it is in a continual state of change. In the chemical sense, plastics play an important role in the materials used by industry and the armed services.

In World War II plastics took over many of the jobs of leather and rubber. They even replaced metal in many instances. Nylon was used for so many essential war jobs that nylon stockings were scarce. Silk is almost completely replaced and synthetic plastic fibers move rapidly ahead in displacing wool and cotton.

The critical metal, tin, is finding plastics substituting for it. Plastic molded parts are replacing laboriously machined parts in war materials; for example, proximity fuse heads formerly made of copper requiring 38 man-hours each, are now molded of polystyrene in one and a half hours each.

More new kinds of plastics and new uses are being developed.

One of the most promising is polyester plastic that already has four promising applications. As Dacron it is a textile fiber that surpasses nylon. Men's shirts and other apparel are being made from it. It was first called Fiber V. In the form of film, transparent, stable and tough, it is having two important uses: Base for photographic emulsions that is better than the conventional cellulose nitrate, cellulose acetate and even the newer cellulose triacetate. As a film for electrical applications, called Mylar, it is a superior insulation and dielectric. Blown into very fine fibers, it is an extraordinary filter medium that will catch deadly germs that might be used in warfare.

A new fluorinated plastic recently announced is resistant to most highly corrosive chemicals and impervious to salt, heat and moisture. Veloform F-10, as it is called, is used as a protective coating against fuming nitric acid.

Water pipes of various plastics are being used more extensively. Pipes are manufactured of polystyrene, polyethylene, cellulosic materials and copolymers of polyvinyl chloride.

Feminine shoes that at first glance seem to be strange colorings of calf, elk and reptile leathers turn out to be vinyl plastic material.

Science News Letter, February 9, 1952

METALLURGY

Magnetic Device Detects Danger Spots in Planes

➤ SAFER AIRPLANE flights should result from a magnetic device revealed in Silver Spring, Md. It locates the dangerous, weak areas in exhaust systems and tail pipes instantly, whether such parts are in place in the aircraft or detached.

Badly scaled and brittle areas of exhaust systems, usually made of stainless steel and inconel alloys, are permeable to magnetism, Max Brodofsky of Pan American Airways discovered. The penetration of the magnetism through the metals increases in direct relation to the change in crystal structure caused by too much heat at the various hot spots of the manifolds and headers.

The Magne-Probe, as the device is called, can detect danger spots just as soon as the metals begin to show signs of weakening so that they may be patch-welded or replaced to avoid failure in flight. The instrument is made by the American Instrument Company in Silver Spring.

Previously the method used was to pound the systems with a hammer until areas weakened by hot exhaust gases gave way. Such "hammer tapping" is often damaging to the part being tested and sometimes critical areas can be missed.

Science News Letter, February 9, 1952

Yosemite Field School

A Workshop in Interpretive Methods

Twenty selected college graduates will have the opportunity to spend the summer in Yosemite National Park under the tutelage of the National Park Service Naturalist Division. They will receive intensive, varied training in the presentation of natural and human history to the public, and in the techniques of interpretation—on nature walks, with children, at campfires. Also considered will be related matter such as museum methods and the use of museum and library materials. Twelve days will be spent in the High Sierra, an opportunity for maturing, exhilarating personal experience. Students pay own expenses, plus modest incidental fee.

Application deadline, February 28.

For prospectus, address:

DIRECTOR, YOSEMITE FIELD SCHOOL
Box 545
Yosemite National Park, California

Books of the Week

TO SERVE YOU: To get books, send us a check or money order to cover retail price. Address Book Dept., SCIENCE NEWS LETTER, 1719 N St., N. W., Washington 6, D. C. Ask for free publication direct from issuing organization.

AN ANALYSIS OF THE MULTI-TEST CLINIC OF RICHMOND, VIRGINIA—Walter E. Boek—*Health Information Foundation*, 267 p., paper, $1.50. This clinic was set up and moved to 23 convenient locations such as department stores and factories. In 15 minutes tests were given for some nine diseases, and about 6,000 persons were tested in a month.

ANALYTIC GEOMETRY—W. K. Morrill—*International Textbook Company*, 383 p., $3.50. An introductory text.

CAMPFIRE ADVENTURE STORIES—Allan A. Macfarlan—*Association Press*, 225 p., illus., $2.95. Stories of wildlife, woodcraft and Indian lore for boys and girls.

THE FIRST ANNUAL REPORT OF THE NATIONAL SCIENCE FOUNDATION 1950-51—*Govt. Printing Office*, 31 p., paper, 20 cents. As Dr. Conant says in his foreword, the report is by necessity a report of progress in formulating plans.

GENERAL EDUCATION IN SCIENCE—I. Bernard Cohen and Fletcher G. Watson, Eds.—*Harvard University Press*, 217 p., $4.00. Distinguished scientists discuss the place of science in the education of non-scientists.

GIANTS OF GEOLOGY—Carroll Lane Fenton and Mildred Adams Fenton—*Doubleday*, rev. ed., 333 p., illus., $3.50. Biographies of men who have contributed importantly to geology from Aristotle to Chamberlin.

HEALTH INSTRUCTION YEARBOOK 1951—Oliver E. Byrd—*Stanford University Press*, 236 p., $3.50. Digesting and summarizing current health literature.

HUTCHINSON'S POCKET TECHNICAL ENCYCLOPAEDIA—L. E. C. Hughes and Jean P. Bremner—*Hutchinson's*, 182 p., Approx., $1.05. Giving explanations of what is known on the subjects listed rather than mere dictionary definitions of the words.

INDUSTRIAL HYGIENE—H. H. Schrenk—*Mellon Institute*, 2 p., illus., paper, free upon request to publisher, 4400 Fifth Ave., Pittsburgh 13, Pa.

MEDICAL MILESTONES—Henry J. L. Marriott—*Williams and Wilkins*, 293 p., illus., $3.50. A physician writes this book for laymen on major medical advances.

MELLON INSTITUTE RESEARCH LABORATORIES—H. S. Coleman—*Mellon Institute*, 13 p., illus., paper, free upon request to publisher, 4400 Fifth Ave., Pittsburgh 13, Pa. Describing the facilities of this institute.

PAPER AND PAPERBOARD: Characteristics, Nomenclature and Significance of Tests, October, 1951—ASTM Committee D-6—*American Society for Testing Materials*, 126 p., paper, $2.50. Of interest to workers in the paper industry and purchasers of paper.

THE PRINCIPLES OF RELATIVITY: A Collection of original Memoirs on the Special and General Theory of Relativity—H. A. Lorentz, A. Einstein, H. Minkowski and H. Weyl—*Dover*, 216 p., paper, $1.50, cloth $3.50. A collection of papers written over a number of years. An inexpensive re-issue of a translation first published in 1923.

PROCEEDINGS OF THE SECOND BERKELEY SYMPOSIUM ON MATHEMATICAL STATISTICS AND PROBABILITY—Jerzy Neyman, Ed.—*University of California Press*, 666 p., illus., $11.00. The application of mathematical statistics to problems of various fields, from astronomy and genetics to traffic engineering, are discussed by specialists in those branches.

RESEARCH ON CHEMICAL CONTROL OF FUNGI IN GREEN LUMBER 1940-51—Arthur F. Verrall and Paul V. Mook—*Govt. Printing Office*, USDA Technical Bulletin No. 1046 60 p., illus., paper, 20 cents. Reporting studies made in an attempt to improve chemical control of stain, mold, and decay.

STRING LUG THE FOX—David Stephen—*Little, Brown*, 174 p., illus., $2.75. A naturalist writes this tale of the life of a fox.

Science News Letter, February 9, 1952

PHYSICS

Pure Hydrogen From Rare Metal Cylinder

➤ A METHOD of getting pure hydrogen gas under high pressure, at least on a small scale, has been developed by Prof. H. B. Wahlin, University of Wisconsin physicist.

While investigating how atomic hydrogen is transmitted through some metals, which is a well-known phenomenon, Dr. Wahlin made a palladium metal tube the cathode in an ordinary sulfuric acid electrolytic bath. He found that hydrogen passes through the metal into the tube in appreciable quantity at ordinary room temperature. Heretofore heat applied to a palladium tube has been used to separate out the hydrogen by diffusion through the metal.

The gas went through the tube and built up a pressure of 700 pounds per square inch, and the possible pressure would be several thousand pounds. In his report to the American Institute of Physics' JOURNAL OF APPLIED PHYSICS (Dec., 1951), Dr. Wahlin predicts other uses will be found.

Science News Letter, February 9, 1952

MEDICINE

Warn Against Measles

➤ THIS IS a big year for measles in many parts of the country. The disease seems to go in cycles, with low and high years. Communities that had a lot of measles last year should be spared this year, since presumably most of the susceptible youngsters got the disease last year and are now immune.

The disease can be dangerous. It is particularly hard on children under three years and on older children who have or are just recovering from some other disease. The danger to the little children and the frail ones can be averted by protective measles globulin. This material from blood contains the anti-measles substances built up during an attack of the disease.

Since most grown-ups in the United States have had measles, the blood now being collected through the National Blood Program has plenty of the anti-measles substances. Scientists have found a way of separating this from the rest of the blood and doctors are using it to protect children.

Anti-measles globulin is also given to older children to lessen the severity of the attack, but not to ward it off completely. Children who are strong enough to stand a mild attack in this way get a chance to build up their own anti-measles substances for protection against future exposure to the disease.

Since doctors can now do so much to cut the danger of measles, parents more than ever should be alert to the signs of the disease and call the doctor promptly. The early signs are like those of common cold at its height with runny nose, sneezing cough and watery, reddened eyes. It is at this stage, before the pink or red spots of the rash appear, that the disease begins to be catching. It continues to be catching while the rash lasts. The child or grown-up with these symptoms should be kept away from other children, especially the babies under three years.

Science News Letter, February 9, 1952

BIOCHEMISTRY

Anti-Thyroid Drug Prevents Convulsions

➤ DISCOVERY THAT an anti-thyroid drug will prevent epilepsy-like convulsions in mice is announced by Dr. Emelia M. Vicari of the Roscoe B. Jackson Memorial Laboratory, Bar Harbor, Me.

The drug is 6n-propylthiouracil. Dr. Vicari tried it in mice that get convulsions from sounds, such as the ringing of an ordinary doorbell attached to the galvanized iron wash tub the mice are in. Usually 100% of mice of this strain get convulsions from such sounds.

When the anti-thyroid drug was fed the mice for nine days before the age of 30 days, the age at which they are most susceptible to sound, 68% of the animals had no seizures and 32% had very mild, short attacks when the bell was rung.

Details of the experiments are reporetd in the PROCEEDINGS OF THE SOCIETY FOR EXPERIMENTAL BIOLOGY AND MEDICINE (Dec.)

Science News Letter, February 9, 1952

PHYSICS

Continual Creation

That matter is continually being created in the universe is one of the most exciting of new physical theories now being widely discussed in scientific circles.

➤ ONE OF the most exciting of new physical theories to come on the scientific scene is the idea that there is continual creation of matter in the universe.

It is a new slant on the unanswered question of where the universe started and how. The suggestion is that, regardless of how it all got going and when, some stuff of the universe is being "born" right now.

The continual creation idea or the steady-state theory of the universe is being discussed in letters that appear in the British science journal NATURE (Jan. 26).

A new formulation of electrodynamics by Dr. P. A. M. Dirac, Nobelist of St. John's College, Cambridge, recently revived the idea that there is an all-pervading ether or medium that is used by light and other electromagnetic radiations, a conception that was thought to have been laid to rest many years ago by failure to find its effects experimentally, as in the famous Michelson-Morley experiment.

The continual creation theory is discussed by its originators, Drs. H. Bondi and T. Gold also of Cambridge University, who suggest that their idea first expressed in 1948 might give physical reality to Dirac's concept. He proposed introducing a charge into a vacuum without fields destroying the vacuum character of the region. This small charge created would possess the velocity of the ether which is resurrected.

The new Dirac electrodynamics has a preferred motion for each point of space. The astronomers when they observe the distant nebulae find a red-shift of the spectrum of their light which is interpreted to mean that these bodies are rushing away in all directions at the same time, what is called an apparent isotrophy. This is a cosmologically preferred state of motion.

Dr. Dirac points out that modern dynamical theory is founded on variation principles. A variation principle requires one to make a small change in the physical conditions and thereby violates some of the laws of nature. An electric charge introduced would violate the law of conservation of electricity. Dr. Dirac observes that the more powerful the variation principle, the greater the number of laws of nature which are considered to be violated.

In the new Dirac theory some of the violations involve the creation of small charges. The theory makes the velocity of these charges quite definite and this provides the ether velocity.

Science News Letter, February 9, 1952

MEDICINE

Eight Iron Lung Centers

➤ SUCCESS OF the first iron lung center for poliomyelitis patients, opened in Baltimore in 1946, has led to establishment of four more of these centers with another three to come, Basil O'Connor, president of the National Foundation for Infantile Paralysis, has announced.

The four now in operation besides the Baltimore one are located in Wellesley Hills, Mass., Houston, Tex., Ann Arbor, Mich., and Buffalo, N. Y.

Iron lungers, or respirator cases as doctors term them, benefit greatly when grouped for treatment, the pilot center in Baltimore showed.

Among the first important discoveries made in Baltimore was that group treatment produced psychological improvement, so that many of the fears and anxieties of these patients could be diminished or even overcome. Patients suffering from the same difficulties helped each other to try breathing without their respirators, even if only for brief periods. They gained hope and will from each other.

From the three-year pilot study the National Foundation evolved its plan aimed at achieving four basic objectives, Mr. O'Connor said. These objectives are:

1. To free patients as completely and as safely as possible from dependence upon respiratory aids such as iron lungs and rocking beds, so that they may return home.

2. To develop better diagnostic and care techniques, including mechanical devices, for victims of bulbar and respiratory polio, the most serious forms of the disease.

3. To develop special teaching and consultative service to physicians and hospitals both in the care of acute and long-term patients with breathing difficulties, and to establish and maintain teaching programs for professional personnel in the care of bulbar and respiratory patients, so that developments at the center will be available to other institutions.

4. To serve as laboratories for the evaluation and development of equipment used by respiratory patients.

Science News Letter, February 9, 1952

● RADIO

Saturday, Feb. 16, 1952, 3:15-3:30 p.m. EST

"Adventures in Science," with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Some of the winners of the Eleventh Annual Science Talent Search from various parts of the country will talk about their scientific projects.

AERONAUTICS

Radical Aviation Advances Predicted Through Research

➤ RADICALLY NEW developments in aeronautics that should "pay off in the design of future aircraft" are being sought by the National Advisory Committee for Aeronautics, it was indicated by Dr. J. C. Hunsaker, chairman, in the NACA annual report.

Great gains in airplane performance of great military significance, details of which can not be told because of security regulations, are in prospect, the report declared. But the report warns that such gains are also obtainable by a potential enemy.

Because the military research and development program has been tripled since the beginning of the Korean conflict, the committee urges more support for its researches which have not kept pace with the military effort due to fund limitations. The committee believes that expansion should be limited only by the availability of scientific manpower.

Science News Letter, February 9, 1952

INVENTION

Automatic Door Mat For Automobiles Patented

➤ AN AUTOMATIC door mat for automobiles may replace, in part, the dead-as-a-dodo running boards. James L. Shuck, Corydon, Ind., received patent number 2,583,894 for his invention. His door mat, a little larger than a person's foot, slides out from under the body of the car when the door is opened.

Science News Letter, February 9, 1952

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BUMPER GUARDS for automobiles, made of rubber or of polyvinyl-chloride plastic and filled with air, are designed to replace the shock absorbers now widely used. These inflated bumper guards are claimed to be highly effective in providing flexibility to absorb chassis and passenger shock.

Science News Letter, February 9, 1952

FLOORING SURFACE for worn, cracked, rutted and disintegrating floors of concrete, wood, asphalt and composition materials is an improved material containing hardwood fiber chemically treated and held together with a plastic binder. It can be applied with a trowel and hardens in 24 hours.

Science News Letter, February 9, 1952

CHANGEABLE BOWLS for the tobacco pipe are made of a porous ceramic whose walls filter out harmful tars and permit only clean smoke to pass through the stem of the pipe. Because the tobacco burns inside the ceramic bowl, a pipe needs no breaking in and the wood itself is never burned.

Science News Letter, February 9, 1952

MINIATURE BATTERY for such tiny flashlights as keylights and lipstick-lights, is three-eighths inch in diameter and less than two inches in length. This dry cell

battery, shown in the photograph, makes possible tiny flashlights for many purposes.

Science News Letter, February 9, 1952

RUBBER CARPET for the stairway covers the backs of the steps as well as the steps themselves and combines the endurance of rubber with the general appearance of ordinary carpet. Made of high-grade rubber, it comes in two widths and in various colors.

Science News Letter, February 9, 1952

AIR DRIER, for use in homes, basements and other places, is an improved device, with an electrically-operated suction fan, that traps the water in the atmosphere just as the outer surface of a glass of cold beverage does on a warm humid day. In it, the moisture collects on cold copper tubes.

Science News Letter, February 9, 1952

ELASTICITY TESTER for fabrics is a device for measuring elastic recovery after they have been stretched lengthwise or crosswise or both at the same time. The equipment is operated by applying tension to a fabric with a systematic series of weights, then releasing the tension.

Science News Letter, February 9, 1952

BED SPECTACLES with prismatic glasses mounted in sturdy plastic frames eliminate the necessity of a reclining reader holding the book in an elevated position or of raising the head with several pillows. They can be worn over regular glasses by persons who normally use them.

Science News Letter, February 9, 1952

Do You Know?

Wild rice, that once grew abundantly along the marshy borders of rivers and lakes in Wisconsin and Minnesota, was an important food for Indians and attracted many of them to the region.

Trumpeter swan is the largest American *bird* in the waterfowl family.

Practically all *dyes* used today are made synthetically.

The *wild fox* likes a rabbit or mouse for food but eats fruits, berries and insects during the months when they are available.

Sagebrush growing on semi-desert land is an indication that the *soil* is fertile and suitable for agriculture if irrigated.

Stars are not brighter in winter as supposed by many; during the winter months there are more bright stars to be seen than during the summer.

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